to get the weight of the uterus with the child on this side, and at the same time push the posterior side fontanelle with the ear over to the mother's right, and backward. By so doing the upper posterior fontanelle is brought downward. By a rotation round the occipito-frontal diameter the position changed to a normal left occipito-anterior.

I would on this occasion call attention to the posterior side fontanelle, which is unduly neglected in the text-books. This fontanelle is by no means rarely felt, and gives exactly the same sensation to the examining finger as the upper posterior fontanelle, three sutures meeting to form either. At the superior posterior fontanelle we have the sagittal and the two branches of the lambdoid; at the posterior side fontanelle it is the lambdoid joining the masto-parietal and the masto-occipital. But they may be distinguished by the adjoining bone. Following the sagittal suture we meet the entirely smooth, evenly convex upper end of the occipital bone, while when we follow the lambdoid we meet the mastoid portion of the temporal bone, which presents rugosities formed by bony ridges and protuberances.

It is particularly desirable that the accoucheur should know the existence of ear presentations on account of the possibility of the examining finger coming in contact with an eye, as in my case—a circumstance that may give rise to irreparable injury if that delicate organ is not treated with due care.

TUMOR OF THE CORPUS CALLOSUM.

By Henry J. Berkley, M.D.,
of Baltimore.

Tumors of the great inter-hemispheric commissure are so rare as scarcely to find a place in the standard literature of cerebral disease, Gowers[1] and Seeligmüller[2] being the only recent writers who have touched upon the subject, and then only passingly. There are, however, scattered through different journals twelve cases, recorded by Mills[3] (1), Glaeser[4] (3), Macguire[5] (1), Bristowe[6] (4), and Bruns[7] (3); in which this part of the brain was involved. The third case of Bruns is so complicated by other tumors, as hardly to be included among the callosal ones;

[1] Gowers: Diseases of the Nervous System, vol. ii., 1888.

[2] Seeligmüller: Gehirn u. Rückenmarks Krankh., 1887.

[3] Mills: Philadelphia Medical Times, 1879.

[4] Glaeser: Berliner klin. Wochenschrift, 1883.

[5] Macguire: American Journal Neurology and Psychology, 1884.

[6] Bristowe: Brain, 1884.

[7] Bruns: Berliner klin. Wochenschrift, 1886.

Mills's is simply an extension from a tumor of the frontal lobe; indeed, all of them are so involved by growths into other parts as to be almost useless in formulating any especial symptom for diagnosis.

Seeligmüller (*l. c.*) gives in accordance with the general teaching for local diagnosis in the brain, as indications, "paucity of tumor symptoms, especially optic neuritis; prominent mental symptoms, bilateral hemi-paresis, no paralysis of the cranial nerves." Gowers (*l. c.*): "Mental dulness and weakness in the limbs," qualifying the statement by adding, "that these symptoms are probably due to pressure, or an extension into the cerebral hemispheres; and we do not yet know of any symptoms that are the result of damage to the callosal fibres."

An analysis of the twelve cases gives headache in six, vomiting in one, epileptiform attacks in one, optic neuritis in six (of which two are very uncertain—Glaeser, Bruns); disturbance of intelligence, principally in the form of dementia, in all cases, hemi-paresis in six, para-paresis in three, muscular stiffness in two.

We have clearly in this summary no pathognomonic symptom that can actually refer to the corpus; headache and mental dulness are the most frequent, and no inference could possibly be drawn from them; optic neuritis is rather infrequent, certainly existing in thirty-three per cent., and the others occur much more commonly in disease of other localities.

The following observation was made a number of years ago in the wards of the then visiting physician to Bay View Asylum, Dr. Reynolds; the post-mortem was performed by the writer.

CASE I.—John E., æt. forty-five, was admitted to the hospital department November 4, 1882, with anasarca and ascites of hepatic causation, diagnosed malarial, as the patient had been subject to ague. For several years previous he had been of unsound mind. No family history was obtainable; he only knew that his parents were generally healthy. His insanity had the form of monomania, and was solely confined to the delusions that he was a great inventor, the discoverer of a perpetual motion machine, and other impossible mechanical contrivances. He also imagined that he had a wonderful knowledge of drugs, and would frequently ask to be given "inward tinctures" of unknown composition, "certain to cure his complaint," and to have his entire body "swathed in slippery-elm poultices," of which bark he carried an immense bundle when he arrived at the asylum. He was not at all depressed when his suggestions were not approved of, and would accept, without hesitation, some simple when given to humor him and replace his "inward tinctures."

E. was a man of rather large build, frame well developed, no noticeable peculiarity in the skull formation. The face had an intelligent expression, he spoke clearly, with rather a choice selection of words, and had evidently received some education. The eyes had a tendency to wander around the room when any one was addressing him. He was extremely loquacious, chatting from morning until evening about his inventions, tinctures, and the like, but could carry on a connected conversation. Memory was quite good, remembered objects and sentences from one day to another without difficulty. Comprehension was not wanting. Hallucinations or illusions were never observed.

There was no headache or vomiting, the eyesight was perfect, there was no incoördination, the movements of the facial, lingual, and muscles of the extremities and trunk were natural, there was no sensory disturbance, the sphincters were under control, the knee reflexes were normal. There were no signs to indicate cerebral disease of any kind except of the mental functions. According to his own statements, he had never drank, nor had syphilis, nor were there any signs of that disease. Death occurred November 26th from pulmonary œdema.

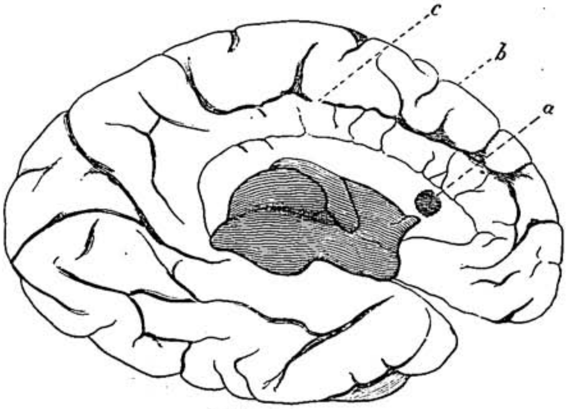
Section twenty-two hours after death. Cadaveric rigidity well marked. Body little emaciated. Skull rather thin but with diploë well developed. Upon the inner surface of the occipital bone, the natural slight eminences in front of the anterior condyloid foraminæ were considerably enlarged; otherwise the skull was symmetrical. The dura mater was normal. The arachnoid space contained no fluid. The pia mater was injected, distended capillaries being seen everywhere in it. The membrane was slightly thickened, and did not peel off readily, but did not drag the cortical matter away with it. Both hemispheres were about equal in size. The frontal lobes, from their middle forward, were exceedingly small, and distinctly depressed below the level of the posterior portions, as could readily be seen on taking the brain in the hand and looking from before backward.

The two hemispheres were separated by a longitudinal incision through the centre of the corpus callosum, when, on examining its cut surfaces, a small, soft tumor of the size of a filbert, grayish in color, without a sharp line of demarcation between it and the sound fibres, was found just posterior to the genu, directly in the middle of the exposed portion of the body, with a thin layer of white fibres above and below, and a considerable body of them in front (Fig., *a*). Cuts made laterally through the tumor showed gray rami of apparently sclerotic fibres, extending into the centrum ovale, toward the tips of the lobes. The basal vessels were sound.

The hemispheres were hardened in a solution of potassium bichromate for further examination; the bulb and a portion of the cerebellum in Müller's fluid, the latter organs being apparently sound.

In the thorax, the heart was normal, valves perfect, muscular walls well nourished. The lungs were throughout œdematous; at the bases some hypostatic pneumonia. In the abdominal cavity the liver was a little enlarged, hard, with thickened capsule. The spleen was also enlarged. Other organs normal.

After hardening the brain for a sufficient time to allow it to become quite firm, the convolutions were studied and sections made horizontally from above downward. The convolutions were richly developed and very complex. On the left side, in the frontal lobe, there was a complete reduplication of the second frontal, making four convolutions. All resolved into an intricate plexus, perhaps more apparent on account of the atrophy. The sulci were wide. An exceedingly deep fissure broke the ascending frontal convolution opposite the superior frontal sulcus, separating the paracentral lobule. The fissures of Sylvius and Rolando pursued their usual course. The convolutions of the parietal, occipital, and temporal lobes though intricate conformed to the regular type. On the internal aspect of the hemisphere the only irregularities were a slight bit of cortical matter bridging the calloso-marginal fissure in its posterior third (Fig., c), and a frequent transverse fissuring of the gyrus fornicatus.



Left hemisphere.

a. Tumor.
b. Line of demarcation or depression.
c. Pli de passage.

On the right side the second frontal was again completely reduplicated, but the anterior part of the frontal convolutions was more withered, the gyri being exceedingly thin, sulci wide, and the line of depression more pronounced. On neither side were the under surfaces of the lobes perceptibly involved, the convolutions being normal in size. On the mesial aspect only the superior frontals were in part involved.

The ascending frontal was interrupted opposite the first and third longitudinal convolutions by two deep furrows, extending into the Rolandic fissure, the lower being the deeper. The Sylvian and Rolandic fissures were like those of the left hemisphere. The inter-parietal sulcus was bridged by a broad pli de passage a little in front of the parieto-occipital fissure which united the two lobes. The remainder of the convolutions conformed to the left side. On the internal surface an exceedingly broad and broken frontal convolution, fused completely in its middle and posterior thirds with the gyrus fornicatus, which was itself conjoined with the convolutions of the lobus quadratus. Posterior to the occipito-parietal fissure the topography returned to the usual type.

The calloso-marginal fissure commenced beneath the anterior extremity of the corpus callosum, ran regularly a short distance until interrupted by the uniting of the gyri, after which but indistinct traces of its course could be seen. The paracentral lobule, instead of being furrowed transversely, was divided by two deep longitudinal sulci.

Section of the brain gave normally formed ventricles, ganglia, and internal capsules. Fornix, corpora albicantia, anterior commissure, and velum well developed. The cortex in the wasted areas averaged about two millimetres at the apices of the convolutions.

The histological examination of the cerebellum showed the nervous structures to be intact, the vessels somewhat distended with blood. In the medulla there was a very coarse granular degeneration of a number of the multipolar cells in the nuclei on the floor of the ventricle, better developed in both nuclei of the hypoglossus than elsewhere. The upper part of the spinal cord was normal.

The wasting of the frontal lobes formed the inexplicable feature of the case. The nerve fibres of the corpus callosum, being connected at either extremity with ganglion cells, are not supposed to degenerate; the basal vessels were sound—even if they had not been, it is difficult to conceive of a vascular lesion affecting so symmetrically both hemispheres, particularly as there are no known vessels that are exclusively distributed to these localities. Moreover, the measurements of the gray matter showed the greater portion of the atrophy to be in the white tracts.

Very recently the enigma received a partial explanation through a second tumor of the same part, kindly given to me for examination by Dr. Councilman, of the Johns Hopkins University, but which was, unfortunately, too diffuse for purposes of topical diagnosis.

CASE II.—This tumor, a gliosarcoma, occupied the whole central region of the corpus callosum, a portion of the left anterior lobe not extending to the cortex, and both optic thalami in part. But the right lobe was free, to a certain extent, and from this numerous sections were made; some parallel with, and including the corpus, some so cut as to give different views of the callosal, projection, and arciform fibres, and stained with Weigert's hematoxylin. The left of these sections contained almost entirely tumor tissue, with a few scattered nerve fibres, but as the slide was passed to the right more and more medullated fibres came to view, until the sub-cortical layers were free in places from the sarcomatous tissue. The fibres of the projection system gave little evidence of degeneration, though occasionally a single fibre might be seen changed, the arciform fibres being beyond the tumor's limit had none, the callosal ones, on the other hand, presented quite a variety of alterations; in some sections large numbers of them could be seen degenerated, with here and there more perfect bundles lying in their midst; where the tumor encroached upon them there were drops of myeline and débris, marking a somewhat recent process, but no granular corpuscles. Great difficulty was experienced in tracing these callosal fibres up to the gray tissues, from their dipping under a bloodvessel, or being interrupted by a spur of the sarcoma-substance, but occasionally it was possible to follow them almost to the lower layers of the brain rind, where they were finally lost.

This degeneration of the commissural fibres accounts for at least a portion of the atrophy in the first case, possibly had the growth been slower, and of longer duration (it was about four months from the date of the traumatism, which apparently caused it, until death), nearly all of the nerve tubes would have followed their fellows.

The duration of the morbid growth in Case I. is a question with an uncertain answer. A friend of the patient, whom I questioned, told me that his mental state had existed for several years. The nature of a glioma is to be very slowly progressive, also the atrophy of the frontal lobes in their anterior portions must have taken a considerable time to advance to the state they were in when death supervened. Can we connect the tumor and wasting with the monomania, which would be against the theories of the most recent writers on the corpus callosum?[1] It is a very open question, taking into consideration the imperfect development of the hemispheres; psychical disturbance is, nevertheless, the most constant result of tumors of the forepart of the brain, and if lesions of the organ have any symptoms, it should be the most constant of them.

From an anatomical, as well as functional view, the case is most interesting and instructive. It accords with Meynert's,[2] as well as Obersteiner's[3] idea: that the callosal system binds together identical portions of opposite hemispheres, both frontal halves being nearly symmetrically atrophied; but completely negatives Hamilton's,[4] of the callosal fibres forming a large part of the internal capsule, and I think proves, as well as a single case can, that the function of the fibres is simply to connect the hemispheres, or, rather, parts of them. Cases, it is true, exist where the corpus has been completely absent without mental peculiarity,[5] but they are very rare, and only prove that the hemispheres may coördinate without its assistance, probably through the medium of the enlarged anterior commissure, as in the cited case, which has the same function (Obersteiner), and has been absent in a number of cases where idiocy was complete.

It would seem from the lack of atrophic changes in the inner and under parts of the frontal lobes, that either the callosal fibres had no connection with those parts, or that they were conjoined by the fibres of the knee and beyond, the latter view being more probably correct.

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[1] Vide Erb, Virchow's Arch., Bd., 97, S. 329; and Kaufmann, Arch. f. Psych. und Nervenkrankh., xix., 1888.

[2] Meynert: Klinik der Erkrankungen des Vorderhirns, p. 41, Wien, 1884.

[3] Obersteiner: Nervöse Centralorgane, Leipsig, 1888.

[4] Hamilton: Brain, 1885.

[5] Vide Eichler: Arch. f. Psych., vol. viii., 1878.